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54. Name of Invention

Electrodeposition Painting Method

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Specification

1. Name of Invention
Electrodeposition Painting Method

2 . Claims

1 . The electrodeposition painting method which is characterized in that after cation type electrodeposition painting is done on the surface of the material and rinsed, anion type electrodeposition painting is done on top of it, and the material is heated and dried.

2 . The electrodeposition painting method of the Claim 1 characterized in that the colors of both cation type electrodeposition coat and anion type electrodeposition coat are Y type and the lightness of both are more than 6.

3 . The electrodeposition painting method of the Claim 1 or 2 characterized in that both cation type electrodeposition painting is done on the surface of the material through to be coated through a chemical conversion film.

4 . The electrodeposition painting method of the Claim 1 or 3 characterized in that the cation type electrodeposition is an epoxy resin with Munsell value of 5Y7/1 and the anion type electrodeposition is an butadiene resin with Munsell value of 5Y7/1.

5 . The electrodeposition painting method of the Claim 4 characterized in that the coating thickness of the anion type electrodeposition coat is 10-15μm.

3 . Description of the Invention

(Field of Invention)
It is about the electrodeposition painting method in which it is possible to form a uniform coated film having excellent corrosion resistance and less color difference by making combination use of anion type electrodeposition painting and cation type electrodeposition painting.

(Prior art and its Problem)
Conventionally, when coating the surface of materials such as switchboards or control panels, the anion type electrodeposition painting was first done on the surface of the material to be coated and then the painting of the coat which is to be applied was carried out over it.

For example, when coating the surface of materials such as switchboards or control panels with paint with its color with Munsell value of 5Y7/1, the process listed below was carried out.

Preliminary degreasing → Degreasing → 1st rinsing → 2nd rinsing → Surface adjustment →

Chemical conversion film → 3rd rinsing → 4th rinsing → Pure rinsing → Draining and drying → Color tone paint (20-30 (m)) → 1st rinsing → 2nd rinsing → 3rd rinsing → Pure rinsing → Drying → Glazing paint of a solvent form paint (30-40 (m)) → Drying

On the other hand, since the cation type electrodeposition painting has been used widely, there has been a demand for making this cation type electrodeposition coated film into the surface layer.

However, when only performing the cation type electrodeposition painting, there will be changes in color differences depending on the heating temperature and time when drying the electrodeposition coated film, or on the conditions in the electric furnace etc.

Fig. 2 shows the changes in color differences (ΔE) to the heating temperature after electrodeposition painting, and when the heating temperature increases (heating time 20 minutes) in any of the curve A (with ventilation), the curve B (without ventilation), and the curve C (with ventilation, but without finish rinsing after the painting), the color difference line becomes 6-8, or 10-20 when the ventilation in the electric furnace is not done sufficient enough, and therefore, when these coated materials are installed next to each other, it will not look good.

This is especially remarkable with the switchboard or the control panel that is prepared with the color of Y lines and with 6 or more lightness.

(Purpose of the Invention)

This invention was completed as a result of conducting research to solve the above-mentioned problems with the prior art, and came to offer the electrodeposition painting method in which it is possible to form a uniform coated film having excellent corrosion resistance and less color difference by making combination use of anion type electrodeposition painting and cation type electrodeposition painting.

(Outline of the Invention)

The electrodeposition painting method of this invention is the electrodeposition painting method in which when coating the surface of materials with a coating film of single color tone, the cation type electrodeposition painting is first done on the surface of the material to be coated and is rinsed, and then the anion type electrodeposition painting is done on top of it and is heat dried.

(Execution Example)

The execution example of this invention is explained in more detail with the figures listed below.

Figure1 is an example of coating a chemical conversion film 2, a cation type electrodeposition coated film 3, and an anion type electrodeposition coated film 4 on the surface of the material 1, such as switchboard or control panel by following the method of this invention, and the surface of the material 1 was formed into a chemical conversion film 2 by a zinc phosphate treatment, etc., after the preliminary degreasing, the degreasing, the 1st rinsing, the 2nd rinsing, and by degreasing and rinsing and the surface adjustment.

Consequently, after the 3rd rinsing, the 4th rinsing, the pure rinsing and the draining and drying are carried out to it, with the material to be coated as a cathode and the counter electrode as an anode, the epoxy resin cation type electrodeposition coated film 3 with 5Y7/1 Munsell value was electrodeposited on it to the thickness of 15-20μm.

Next, after the material coated with the cation type electrodeposition coated film 3 was rinsed and cleaned, the coated film 4 of the polybutadiene resin anion type electrodeposition paint with 5Y7/1 Munsell value was electrodeposited to the thickness of 10-15μm with the material to be coated as a cathode and the counter electrode as an anode, and after it was rinsed again, it is heated and dried for 20 minutes at 165DEGC-180DEGC.

By electrodepositing the anion type electrodeposition coated film 4 with the thickness of 10-15μm on the cation type electrodeposition coated film 3, it became possible to adjust the color tone (ΔE) which was about 20 to less than 2 as it is shown in Figure.3.

When conducting a test with a cross-cut cellophane adhesion tape (Scotch tape) with the width of 1mm in order to measure the adhesion nature between layers of epoxy resin cation type electrodeposition coated film 3 and the polybutadiene resin anion type electrodeposition coated film 4, the result was 100/100 which meant that there was no exfoliation, and it turned out that they had an excellent adhesive nature.

Moreover, when conducting a salt water spraying examination for 500 hours as a corrosion-resistant examination, there was no rusting seen and the good results were obtained.

In addition, although the execution example of this invention was only about the method for coating the surface of the material, such as switchboard or control panel, this invention is not limited to these, and it is possible to obtain the same results when it is applied to metal materials, such as copper material and aluminum.

Moreover, when the voltage between the material to be coated and the counter electrode is adjusted at the time of the anion type electrodeposition painting, it is also possible to create a pattern on the coated surface.

(Effect of the Invention)

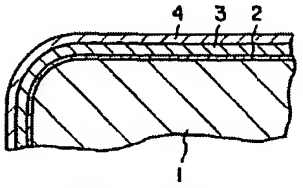
This invention has made it possible to obtain a uniform coated film having excellent corrosion resistance and less color difference.

Moreover, since the prime coating and the glaze coating are both performed by the electrodeposition and the equipments, such as a rectifier etc., can be shared, it is possible to carry out the drying of both prime coat and the glaze coat in one heating drying process, and therefore, the efficiency of the electrodeposition can be improved.

4. Brief Explanation of the Drawings

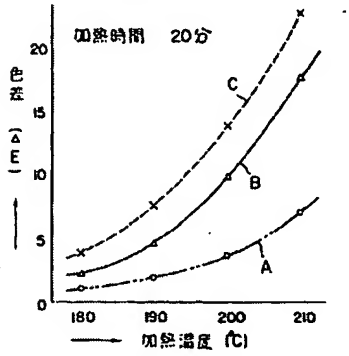
Fig. 1 is a cross-sectional view which shows the material which is coated by the method of this invention, Fig. 2 is graph which shows the relationship between the heating temperature and the color tone at the time of making the anion type electrodeposition coated film as the surface coat, and Fig. 3 is graph which illustrates the relationship between the thickness of the paint and the color tone.

1. Surface of the material to be coated
2. Chemical conversion film
3. Cation type electrodeposition coated film
4. Anion type electrodeposition coated film



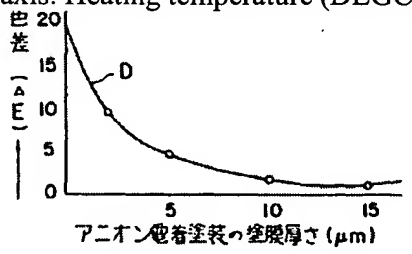
第 1 図

Fig. 1



第 2 図

Fig. 2,
X axis: Heating temperature (DEGC), Y axis: Color tone (ΔE), In figure: Heating time 20 minutes



第 3 図

Fig.3
X axis: Thickness of the anion type electrodeposition coated film (μm), Y axis: Color tone (ΔE)